The linguist Benjamin Lee Whorf outlined an influential theory of the interactions between language and thought in his classic 1956 article “The Relation of Habitual Thought and Behavior to Language.” This paper played an important historical role in modern linguistics with its introduction of the concept of linguistic relativity, the idea that language influences our thought and perception of reality at very basic levels, leading to differences in behavior and cognition between speakers of different languages. Whorf believes that the mechanism of this linguistic influence lies in the subtle shaping of “habitual thought” by the usage over time of certain linguistic patterns and structures. Although he suggests a certain “affinity” between
thought and linguistic structure, Whorf is reluctant to identify any specific causations or correlations between language and tendencies in thought and behavior (Whorf 1956:139). This is perhaps because the relativist notion of direct linguistic influence on behavior is on its face a radical claim. Whorf admits the impossibility of predicting specific characteristics of a culture from the structure of its language (Whorf 1956:159). Nevertheless, Whorf believes in principle that certain basic concepts “are not given in substantially the same form by experience to all men but depend on the nature of the language or languages through the use of which they have been developed” (Whorf 1956:158). Moreover, he expects these connections “eventually to be discoverable by study” (Whorf 1956:159).

In their 1997 paper “A Cross-Linguistic Study of Early Word Meaning: Universal Ontology and Linguistic Influence,” the psychologists Mutsumi Imai and Dedre Gentner reported the results of a study in which they sought to test such theories of linguistic influence on thought. In this paper, they examined a single basic concept across two languages with basic structural dissimilarities. Imai and Gentner studied the ways in which English and Japanese speakers classify various items as either substances or objects. In English this categorization is marked structurally by the delineation of objects as count nouns (a door, two hammers) and substances as mass nouns (some water, an acre of land). The Japanese language lacks this distinction, treating every noun as a mass noun in the sense of requiring a
“unitizer” (a liter of milk, an hour of time) for discrete reference to a specific quantity (Imai and Gentner 1997:169, 173). Imai and Gentner wanted to test whether these structurally dissimilar modes of description produced idiosyncratic patterns of behavior in English and Japanese speakers by the Whorfian influence of habitual use. While their findings exposed divergent cross-linguistic behavior, the constancy of their results across age groups makes an argument against Whorf’s habitually acquired relativity. It suggests that the culturally subjective substance-object distinction is in fact based on some other differentiation prior to the habitual linguistic patterns identified by Whorf.

Imai and Gentner proposed to investigate possible influence by these structures on the ways in which English and Japanese speakers distinguish substances from objects (Imai and Gentner 1997:169). The categories of “object” and “substance” are the sort of concepts, like “time” and “matter,” that Whorf thought were not defined by universal experience but instead varied from culture to culture depending on linguistic structure (Whorf 1956:158). For Whorf, the distinctions embodied in these categories are not objectively given by the universe, but rather depend on the projection of linguistically conditioned human experience onto reality. Indeed, Whorf observes that this categorization “is more widespread in language than in the observable experience of things . . . The distinction is somewhat
forced upon our description of events by an unavoidable pattern in language” (Whorf 1956:141).

In an attempt to test this claim, Imai and Gentner took four age groups of monolingual native Japanese and English speakers (early and late 2-year-olds, 4-year-olds, and adults) and subjected them individually to three types of trials. In each, the subject was first presented with a standard item – respectively, a simple object such as a pyramid, a complex object such as a whisk, and a substance such as sand. This first item was introduced with a nonsensical label in a syntactic frame designed to leave ambiguous whether the name referred to the shape or the material of the item. They would say, for example, “Look at this dax.” The subject was then presented with two alternatives, one sharing the original item’s shape and the other its material. Thus one trial first presented a cork pyramid as “dax” and then a plastic pyramid and a chunk of cork; another presented sand in an S-shape, followed by pieces of glass in an S-shape and three piles of sand. The subjects were then asked to point to which of the latter alternatives was “dax.” If they identified the shape alternative, it would mean they had classified “dax” as an object; choice of the material alternative would imply its categorization as a substance (Imai and Gentner 1997:179-181).

Imai and Gentner predicted that if the substance/object distinction were universally innate or formed very early, the youngest children would produce similar results regardless of language. Imai and Gentner anticipated the youngest children
would base their choices on the nature of the presented items and so primarily identify distinct solid shapes as objects and non-solid materials as substances. The psychologists acknowledge Whorf’s theory of habitual linguistic influence by speculating that any differences across language will emerge only later, “after language has had the opportunity to add its influence to this system of initial constraints” (Imai and Gentner 1997:177). If, on the other hand, the substance/object distinction were linguistically acquired from the beginning, Imai and Gentner predicted sharp differences between the two groups from very early on. They expected English-speaking children to define both complex and simple objects by shape and non-solid materials by substance, reflecting their sharp linguistic distinction between these categories. They further expected Japanese children either to perform randomly or to demonstrate a material bias (Imai and Gentner 1997:177).

Imai and Gentner’s results point to significant differences in substance/object classification between speakers of the two languages, contradicting a simple non-relativist concept of the distinction as wholly innate and linguistically universal. At all ages English speakers more often identify simple objects by shape rather than by material, with on average 77.25% of English speakers choosing shape as opposed to an average 48.75% of Japanese speakers. In addition, in the substance trials Japanese speakers consistently went by material more often (an average
88.5%) than did their English counterparts (53.5%). The complex object trials yielded consistently high shape responses across both groups at all ages, although at generally slightly higher rates (an average 90.5%) for English speakers than for Japanese speakers (85.75%) (Imai and Gentner 1997:182).

These consistent discrepancies in substance/object identification by Japanese and English speakers make a strong argument for the influence of linguistic structure on basic conceptual thought. There may be a universal necessity of dividing reality into substances and objects, but the nature and location of this division varies so greatly and reliably between the speakers of these two languages that language appears overwhelmingly likely to play some role. At the same time, Imai and Gentner’s results also establish that the linguistically specific character of the substance/object distinction is established extremely early in childhood, apparently before the acquisition of the relevant grammatical divergence between the two groups (Imai and Gentner 1997:169). Imai and Gentner do not speculate as to the age at which Japanese children grasp proper unitizer use (Imai and Gentner 1997:173), but they confirm that tests with English-speaking early 2-year-olds “convincingly demonstrate that the children failed to command count/mass syntax” (Imai and Gentner 1997:172).

In both the complex and simple object trials, however, early 2-year-old English and Japanese speakers were already
displaying the differentiations that would continue to characterize their respective substance/object distinctions into adulthood (Imai and Gentner 1997:182). This suggests that the linguistically relative element of the substance/object distinction does not in fact emerge by Whorf’s proposed method of habitual language usage over time. Very young children have not yet acquired this kind of habitual experience of language use, having indeed barely begun to speak. Although Imai and Gentner’s research shows a clear pattern of divergent behavior between speakers of the two languages, it does not demonstrate the kind of linguistic relativity envisioned by Whorf.

Artisans of Whorf might dispute the assumption that count/mass grammar is the pertinent Whorfian structure here and argue that as early as age 2 English speakers have acquired the relevant linguistic framework to influence their perception. Imai and Gentner acknowledge that it is “impossible in principle . . . to rule out the possibility that the children possessed some tacit knowledge of count/mass syntax” (Imai and Gentner 1997:172). In considering Whorf’s hypothesis this is an irrefutable if not a particularly fruitful line of argument. It may well be true that as early as age 2 the English speakers were sufficiently immersed in the language to have their basic perceptions altered, though they did not yet exhibit the manifestations of this either consciously or instinctively.
But Whorf’s hypothesis is concerned with “habitual thought and behavior” (Whorf 1956:134). The mechanism by which he believes linguistically determined concepts to “become fixed in the language as integrated ‘fashions of speaking’” (Whorf 1956:158) is not some untraceable encoding that occurs extremely early in a child’s learning and remains essentially static thereafter. Rather he argues that by the “most ordinary everyday analysis of phenomena” (Whorf 1956:135) over time our patterns of conceptual thought are “to a large extent unconsciously built up on the language habits of the group,” to quote his mentor, the linguist Edward Sapir (Whorf 1956:134). We grow so accustomed to calling some gasoline drums “empty,” for example, that we forget the explosive vapor inside and acquire “careless” habits of behavior around them (Whorf 1956:135). This sort of pattern is something clearly outside the experience of 2-year-olds. These children, if they have managed to acquire habits or “patterns of denotation and reckoning” (Whorf 1956:145) at all in their first exploratory months of speech, have certainly not built them up within and alongside a group. It is not at all clear that at this inquisitive, exploratory, and volatile point in the learning process that children can have linguistic habits in the adult sense of “a cultural non est disputandum,” or something not to be debated (Whorf 1956:138). If linguistic influence is built up over time by repetitive habituation to certain fashions of speaking and thinking, then Japanese and English speakers should, as Imai
and Gentner predicted, demonstrate greater uniformity at very young ages and then diverge with age and linguistic differentiation. These expectations were decisively contradicted by the results of this experiment.

The linguistic tendencies with which Whorf is concerned are pervasive and often subconscious, but they are certainly not evasive of observation by rigorous linguistic study. Indeed, Whorf believes “the best approach” to their identification to be “through an exotic language, for in its study we are at long last pushed willy-nilly out of our ruts” (Whorf 1956:138). Imai and Gentner’s cross-linguistic behavioral study, then, should have been exactly the sort of experiment to clearly confirm or refute Whorf’s hypothesis. Of course, the substance/object distinction is only one case. Though Whorf himself clearly argues that the distinction belongs in the category of linguistically determined concepts (Whorf 1956:140-141), he may be wrong. No single experiment could validate or disprove so complex a theory of thought and language, but the data here clearly present serious problems for Whorf’s hypothesis.

Whorf explains that “by ‘habitual thought’ and ‘thought world’ I mean more than simply language, i.e. than the linguistic patterns themselves. I include all the analogical and suggestive value of the patterns . . . and all the give-and-take between language and culture as a whole” (Whorf 1956:147). Given the vast divergence between their respective habitual experiences
and linguistic patterns, it seems a strange and perverse idea that a 2-year-old’s English “thought-world” and an adult’s should produce nearly identical cognitive patterns. This documented and enduring consistency across age groups presents a noteworthy example of differences in thought across languages but rebuts the Whorfian conception of habitual linguistic usage as the basis for these disparities. Imai and Gentner’s substance/object study proves if nothing else that our perception of this basic concept remains unchanged from a very young age, certainly long before the acquisition of recurring habits and adult linguistic familiarization to quotidian language.
Endnotes

1 The substance trial results are complicated by the anomalous result of the early 2-year-old age group, in which Japanese children showed an unusually high preference for shape (45% as opposed to sub-20% for all other age groups) (Imai and Gentner 1997:182). This still represents a majority preference for material, however, and it should also be noted that the singular occurrence of this anomaly only here makes it awkward to fit into a Whorfian argument. Either the relevant formative linguistic structure has already set in at this age, in which case the 2-year-olds’ unique substance trial results are problematic, or it has not yet solidified, in which case there remains to be explained their performance consistent with older speakers in both the complex and simple object trials.
Works Cited
